AFFIDAVIT OF DR. MICHAEL TREFZ

I, Dr. Michael Trefz, state as follows:

1. Exhibits A and B attached herewith are incorporated by reference into this declaration.

2. I received a Diploma in Chemical Engineering from the University of Stuttgart in Stuttgart, Germany in 1986 and a Ph.D. in Chemical Engineering from the University of Stuttgart in 1992.

3. Since November 1997 I have been employed by Voith Sulzer Paper Technology North America, Inc., in Appleton, Wisconsin, in the position of Manager of Applied Technology for Paper Coating Equipment. Prior to my present employment, from March 1992 until November 1997, I was employed by Voith Sulzer Papiermaschinen GmbH, in Heidenheim, Germany, in the position of Research Engineer Paper Coating Processes. Voith Sulzer Paper Technology North America, Inc. and Voith Sulzer Papiermaschinen GmbH are both subsidiaries of Voith Sulzer Papiertechnik GmbH of Heidenheim Germany. Voith Sulzer Papiertechnik GmbH is a licensee under U.S. patent no. 5,603,767, to which this affidavit relates.

4. Voith Sulzer Paper Technology North America, Inc. and Voith Sulzer Papiermaschinen GmbH are extensively involved in the fields of papermaking and paper coating machines and processes. As a result of my employment with those two companies, I have gained considerable experience in the processes and equipment employed in the fields of papermaking and paper coating, and particularly in the field of paper coating. As a result of my experiences, I consider my level of skill and knowledge to be that of one of ordinary skill in the paper coating art.

5. I have reviewed U.S. patent no. 5,603,767 to Wayne A. Damrau (Exhibit A) to determine whether the web coating apparatus disclosed by the patent has an elongate coating liquid outlet nozzle that is variable in outlet width. Based upon this review and my knowledge of the field of art and my experience prior to September 11, 1992, I have reached the conclusion that the coating apparatus has a coating liquid outlet nozzle that is variable in width.

6. The Damrau patent teaches two embodiments of web coating apparatus, respectively shown in Fig. 2 and Fig. 4. In the coating apparatus of Fig. 2, a coating liquid outlet nozzle is identified by the reference numeral 74 and in Fig. 4 a coating liquid outlet nozzle is identified by the reference numeral 74'.

These outlet nozzles are elongate in the cross-machine direction. It is my conclusion that each of these outlet nozzles is variable in width in the machine direction.

7. My conclusion is based upon a review of the teachings of the Damrau patent. The patent specification teaches at column 3, line 61 to column 4, line 2, that the radius of the curved surface 78 is selected for the magnitude of centrifugal force to be exerted on the coating liquid sheet flowed along the curved surface. It also says there that the magnitude of centrifugal force is a function of the flow velocity of the coating liquid sheet across the curved surface. Further, it is said that the flow velocity of the coating liquid sheet is a function of the cross sectional area of the coater outlet nozzle and of the volume flow rate of coating liquid through the nozzle. The cross sectional area of the outlet nozzle is equal to the product of the length and width of the nozzle, and the magnitude of centrifugal force is therefore a function of the width of the outlet nozzle.

8. The Damrau patent specification also teaches, at column 6, lines 12-48, that the centrifugal force exerted on the sheet of coating liquid is equal to the product of the mass of the coating liquid and its flow velocity squared, divided by the radius of the deflector tip curved surface 78. Since the mass of the coating liquid may be considered a constant, the centrifugal force exerted may be controlled by changing either the flow velocity of the coating liquid sheet or the radius of the curved surface. The flow velocity is a function of the cross sectional area of the outlet nozzle and of the volume flow rate of coating liquid through it, and is said to be chosen so that the applied coating completely and uniformly covers the surface of a paper web. Since the cross sectional area of the outlet nozzle is the product of its length times width, it is my opinion that the specification discloses that one way to control the centrifugal force exerted on the coating liquid sheet is by varying the width of the outlet nozzle.

9. I further noted the teachings of the Damrau patent specification at column 6, line 54 to column 7, line 25. At column 6, lines 66-67 it is said that the outlet nozzle can have a width in the range of about 0.025" to 0.050". Also, two examples of coating apparatus parameters are recited at column 7, lines 4-25, where the outlet nozzle has a different width in each example. This means to me, and would mean to one of ordinary skill in the art, that the width of the outlet nozzle must be capable of being varied.

10. In addition to reviewing the teachings of the specification, and while bearing the teachings of the specification in mind, I also reviewed the coating apparatus shown in each of drawing Figs. 2 and 4 of the Damrau patent, and

have concluded that the structure there shown accommodates varying the width of the coating apparatus outlet nozzle. This comports with the teachings of the specification that the outlet nozzle can have various widths. The particular structure in each of Figs. 2 and 4 that accommodates varying the width of the outlet nozzles 74 and 74' is substantially identical. For my review I therefore made reference primarily to the coater structure shown in Fig. 2.

11. For my review of Fig. 2, I added to the drawing reference "letters" to identify structure that is shown but not otherwise identified by reference numerals, as shown by attached Exhibit B. I observed that the plate 64 of the coating apparatus 50 has a channel A that extends along the length of the plate in the cross-machine direction. The channel defines in the plate a relatively thin web of material B extending in the cross-machine direction between relatively thicker lower and upper plate portions C and D. Taken together with the teachings of the specification that the width of the outlet orifice 74 is variable, and further for reasons I will describe below, it is clear to me that the purpose, and the only logical purpose, of the thin web B is to accommodate relative flexure of the lower and upper plate portions C and D

12. A plate E overlies the plate 64. Toward its lower end the plate E abuts the lower portion C of the plate 64. Fasteners F, which inherently would be spaced in the cross-machine direction, extend through the plate E and the lower plate portion C into the upper end of the applicator rear wall 62. The fasteners are shown as attaching the plates 64 and E to the applicator rear wall and clamping the plate 64 between the plate E and the rear wall. It is clear from the drawing that the lower portion C of the plate 64, as so clamped, is not movable relative to either the plate E or the applicator rear wall.

13. Exhibit B shows that an upper portion of the plate E is relieved from the lower end of the channel A to the upper end of the plate E. The relief defines a space G extending in the cross-machine direction between the upper portion of the plate E and the upper portion D of plate 64. Exhibit B also shows that the plate E, between the channel A and the upper end of the plate E, has countersinks H that would inherently be spaced along the plate in the cross-machine direction. Within each countersink is the head of a bolt I that extends through the plate E into the upper portion D of the plate 64.

14. The bolt I as shown in Exhibit B has threads. However, Exhibit B does not specifically show whether one or both of the bolt passages in plate E and the upper plate portion D are threaded to engage the bolts. Since one or both of the passages in the plate E and upper plate portion D must inherently be threaded (otherwise what would be the purpose of the threaded bolts I?), to

determine what the threading arrangement might most reasonably be, I considered the various alternatives. The possible alternatives are: (1) the bolt passages in both the plate E and the upper plate portion D are threaded; (2) only the bolt passages in the plate E are threaded; (3) only the bolt passages in the upper plate portion D are threaded, and (4) in some, but less than all, of the pairs of aligned passages in the plate E and the upper plate portion D, only the bolt passages in the plate E are threaded, and in the remaining pairs of aligned passages only the bolt passages in the upper plate portion D are threaded.

15. I rejected alternative (1), which contemplates that the bolt passage in each of the plate E and the upper plate portion D be threaded. I did so since with alternative (1), the existence of the gap G eliminates any assurance that the forward end of the bolt threads, after passing through the plate E and the gap G, would be properly rotationally oriented to engage and enter into a threaded bolt passage in the plate portion D. Alternative (1) clearly would not be contemplated by or acceptable to one of ordinary skill in the art.

16. I found, however, that alternative (2) would be acceptable and would provide for varying the width of the outlet nozzle 74 by means of the bolts I. In alternative (2), the passages in the plate E are threaded, but not the dead end passages in the plate portion D. With this arrangement, rotating the bolts I to drive them against the inner ends of the dead end passages in the plate portion D would move the upper end of the plate 64 toward the deflector tip 72 to reduce the width of the outlet nozzle 74. On the other hand, rotating the bolts in the opposite direction would allow the upper end of the plate 64 to move away from the deflector tip 72 to increase the width of the outlet nozzle. During such movement of the plate portion D, the web B would inherently flex and act as a spring hinge while it accommodates flexure of the upper plate portion D relative to the immobile lower plate portion C.

17. I also found that alternative (3) would be acceptable and would also provide for varying the width of the outlet nozzle 74 by means of the bolts I. In alternative (3), the passages in the portion D are threaded, but not the passages in the plate E With this arrangement, rotating the bolts to drive their heads against the bottom of the countersinks H in the plate E would pull the upper end of the plate 64 away from the deflector tip 72 to increase the width of the outlet nozzle 74. On the other hand, rotating the bolts in the opposite direction would allow the upper end of the plate 64 to move toward the deflector tip 72 to decrease the width of the outlet nozzle. During such movement of the plate portion D, the web B would inherently flex and act as a spring hinge while it accommodates flexure of the upper plate portion D relative to the immobile lower plate portion C.

18. I further found that alternative (4) would be acceptable and would also provide for varying the width of the outlet nozzle 74 by means of the bolts I. In alternative (4), in some of the pairs of aligned passages in the plate E and the upper plate portion D only the bolt passages in the plate E are threaded, while in the remaining pairs of aligned passages only the bolt passages in the upper plate portion D are threaded. Alternative (4) is a combination of alternatives (2) and (3). With alternative (4), the plate portion D can be selectively moved by the bolts I in either the direction that reduces, or the direction that increases, the width of the outlet nozzle 74, as described in Paragraphs 16 and 17 hereof in connection with alternatives (2) and (3).

19. I have thus concluded that one of alternative (2), alternative (3) or alternative (4) would be found in the structure of the coating apparatus of Fig. 2, and that any one of the alternatives would enable the width of the outlet nozzle to be variably controlled. This conclusion comports with the teaching of the specification that the width of the outlet nozzle may be chosen to control the magnitude of the centrifugal force to which the coating liquid sheet, emitted from the nozzle, is subjected. This conclusion also comports with the teaching of the specification that the width of the outlet nozzle can fall within, and is therefore variable within, a range of values.

20. It is my opinion that one of ordinary skill in the art must reach the same conclusions that I have reached. One of ordinary skill in the art would understand and conclude that the Damrau patent discloses that the width of the coating liquid outlet nozzle is variable, and that the structure of the coating apparatus would accommodate varying the width of the outlet nozzle.

STATE OF WISCONSIN)
) ss
COUNTY OF OUTAGAMIE)

That on this 8. day of March 1999, personally came and appeared before me Dr. Michael Trefz, who after being first duly sworn, deposes and says that the foregoing, to the best of his knowledge, is true.

Dr. Michael Trefz

SUBSCRIBED TO AND SWORN TO before me this 8th day of March 1999.

Notary Public

My Commission Expires 1/13/02

EXHIBIT B

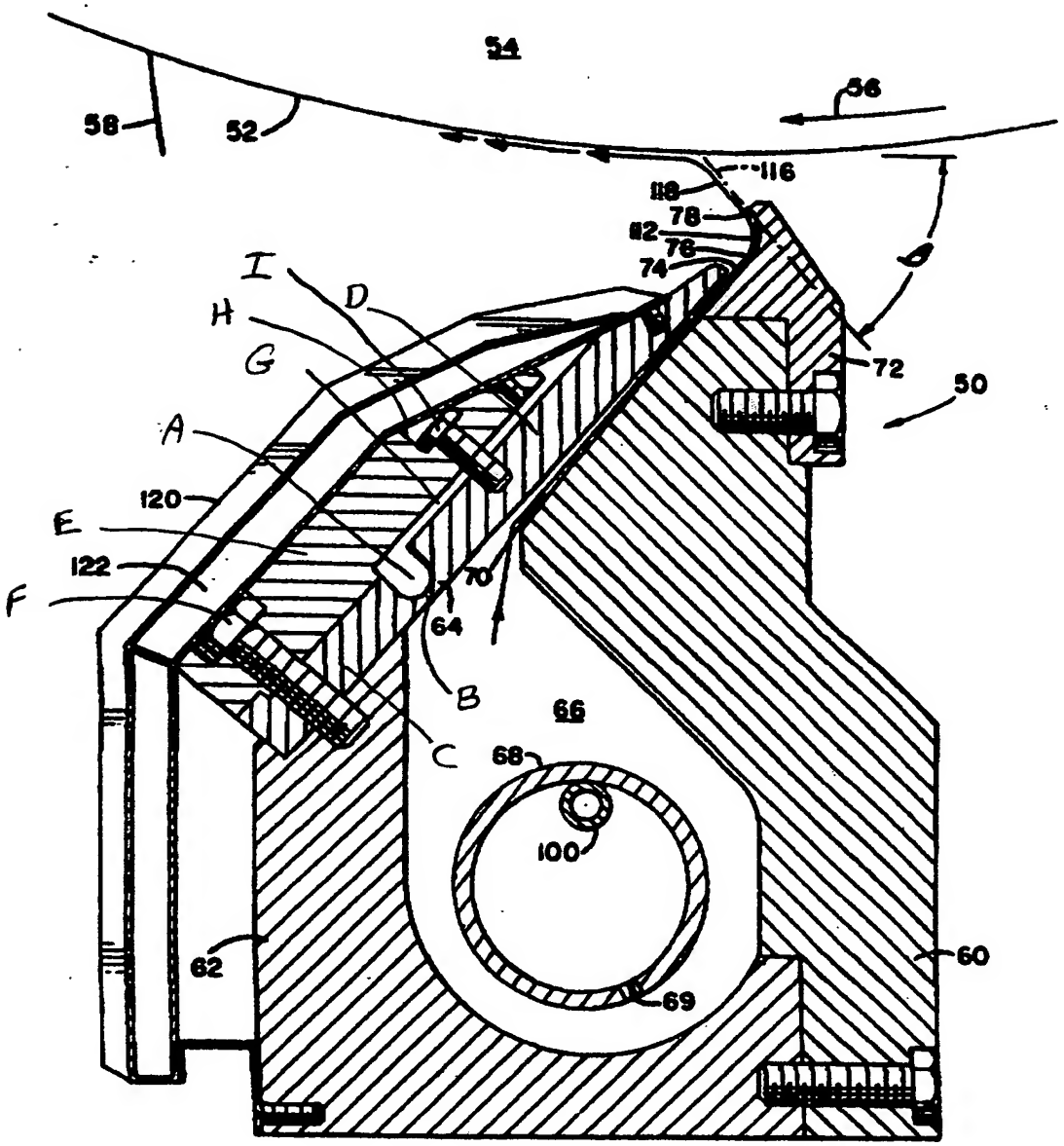

FIG. 2